ASOS MODIFICATION NOTE 37 (for Electronics Technicians)
Engineering Division
W/OSO321:AJW

SUBJECT	:	Installing Visibility Firmware Version 037 and Visibility Crossarm Cable Guides
PURPOSE	:	To eliminate the heater diagnostic problem. Cable guides are added to restrain the cables from snagging and contacting the transmitter and receiver canisters.
EQUIPMENT AFFECTED:		ASOS VISIBILITY SENSOR (AVIS)
PARTS REQUIRED	:	Visibility Firmware Version 037 S100-2MT5A1A1-U2, Firmware Version 037 and Cable Guide Kit or S100-FMK029-42.
MOD PROCUREMENT	:	Order part S100-2MT5A1A1-U2 for all sites except those listed in APPENDIX E. Order part S100-FMK029-42 for sites listed in APPENDIX E.
SPECIAL TOOLS REQUIRED	:	S100-TE305-1 may not be included in the visibility calibration kit S100-TE305. The jumper, Molex Connector S100-TE305-1 can be ordered directly from NLSC.
TIME REQUIRED	:	2 hours
AFFECT ON OTHER INSTRUCTIONS	:	Modification Note 13 and Errata sheet 1 are superseded. Refer to Maintenance Note 31. The transmitter optical Detector Function check, can be completed when this Modification is performed.
CERTIFICATION STATEMENT	:	This modification is authorized by Engineering Change Proposal E96SM05F157. This Modification was tested by the Engineering Division at Sterling Virginia, SMI, Belfort and the OT&E sites identified in APPENDIX C.

GENERAL

This modification note provides instructions for replacing the EPROM on the visibility sensor processor board. The updated firmware eliminates the visibility heater diagnostics and eliminates the false heater failure(s) that occur when the temperature drops below 40°F. The EPROM on the visibility processor board changes from firmware version 036 to 037.

The modification also provides instructions for installing two stainless steel cable guides in the visibility sensor crossarm assembly. The guides provide strain relief and keep the cable from snagging during insertion and removal of the transmitter and receiver canisters. Additional instructions are provided for checking the soldering of the heater wire in the visibility transmitter and receiver canisters.

PROCEDURE

This procedure provides instructions for installing the EPROM (U2) version 037 on the visibility processor board. Included are installation instructions for the stainless steel cable guides.

BEFORE INSTALLING FIRMWARE

1. Call the AOMC at 1-800-242-8194. Inform the person who answers the phone at which office the new firmware will be installed.

2. For commissioned sites, get approval of the responsible MIC/OIC before starting installation. For noncommissioned sites, the el tech must coordinate with the site MIC/OIC before starting installation. Installation may be performed on any day of the month if permission is granted and the restrictions in steps 3 and 4 are complied with.

3. Commissioned Sites Only: Do **not** start installation during bad weather, precipitation, instrument flight rule (IFR) conditions, or if any of those conditions are expected within 3 hours. These meteorological conditions will be defined by the responsible MIC/OIC.

4. Do not start firmware installation at a time that will conflict with scheduled synoptic observations at ØØ, Ø3, Ø6, Ø9, 12, 15, 18, and 21Z.

5. Immediately before beginning work at NWS staffed sites, the MIC/OIC/Observer will inform the tower and any other critical users that the ASOS visibility sensor will be shut off for firmware upgrade (for unstaffed sites, the el tech will inform the tower).

6. Do not begin the installation process, until immediately after an hourly observation has been transmitted. At NWS-staffed sites, normal backup observing procedures will be implemented.

7. The system voice function will automatically broadcast visibility missing messages when the visibility power is turned off.

8. Make the appropriate SYSLOG entries, (MAINT-ACT-FMK) Mod 037.

   a. Log on a **TECH**.
   b. Key the **MAINT** screen.
   c. Key the **ACT** page.
   d. Key **START** - Stop here and perform Mod 037.
      Upon Completion of Mod 037, Log onto the system.

9. Continue with Appendix A and Appendix B if not completed previously.

AFTER INSTALLING FIRMWARE

10. When visibility is restarted at unstaffed sites, call to inform the tower that the work is complete. (At staffed sites, the MIC/OIC/Observer will call the tower).

11. If on-site NWS staff provides backup while the installation is underway, no special observation is needed when ASOS is restarted.

12. Inform office staff that ASOS is again operational. The chart below indicates how long it takes after start up for ASOS to report each observation element automatically.

Times Needed for Elements to be Reported Automatically

	Minimum	Maximum
Visibility	10 minutes	15 minutes
Obstruction to Visibility	10 minutes	*

* Maximum time not applicable since phenomena may not be present. Minimum time applies if phenomena are present.

13. Verify that ASOS transmitted an hourly observation. Call the AOMC at 1-800-242-8194 and tell the operator:

a. Your location,
b. That installation of the new firmware has been completed, and
c. That ASOS is operational.

14. Enter the SYSLOG that maintenance has been completed.

a. Key the **MAINT** screen.
b. Key the **ACT** page.
c. Key **FMK** - Enter the Field Mod Kit (FMK) number as follows: **Mod 037**
On the second line of the screen verify that only **Mod 037** is displayed. Complete by entering **Y** in the Y/N if only **Mod 037** is displayed. If **Mod 037**is completed, make appropriate log entry.
d. Check the **SYSLOG** and verify the **FMK** message. **Enter a comment in the SYSLOG stating that Mod 037 has been installed and the Heater Diagnostics are disabled. Specifically identify sensors that have the heater diagnostics disabled. Notify the AOMC via telephone that Mod 037 and any other Mods have been completed. Clear any maintenance flags caused by installing this mod.**

15. At an expansion site with Air Traffic Control Tower (ATCT), the el tech will contact ATCT and supply information on the following:

    a. ASOS maintenance completed,
    b. ASOS visibility has been restored to service.

REPORTING MODIFICATION

Target date for completion of this modification is 90 days after the receipt of parts. Report completed modification on a Weather Service Form A-26 maintenance record, using instructions in EHB-4, Part 2, Appendix F, use reporting code AVIS.

Also, record the modification number in block 17 (A) as 037 (see Appendix D for a completed sample of WS Form A-26).

NOTE:
Parts removed (EPROMs) should be properly packed and returned to NRC as S100-FMK0037.OLD. NRC will be reprogramming the EPROMs for other ASOS applications.

Signed 01/29/97
John McNulty
Chief, Engineering Division

Appendix A
Appendix B
Appendix C
Appendix D
Appendix E

INSTRUCTIONS

VISIBILITY SENSOR FIRMWARE REMOVAL AND REPLACEMENT PROCEDURE

Tools Required: Large flat-tipped screwdriver
No. 1 Phillips screwdriver

WARNING
Death or severe injury may result if power is not removed from sensor before performing maintenance activities.

1. At the DCP cabinet, set the visibility sensor circuit breaker module to OFF (right) position.

2. At the sensor, using the large flat-tipped screwdriver, open the visibility sensor electronics enclosure access door and locate the processor board A1A1 (P/N 32194-1). Using the Phillips screwdriver, remove captive screw securing processor board to standoff. This screw is on the bottom side of the board. See figures 1 and 2.

3. Carefully remove processor board by pulling it free from backplane connector XA1.

4. Using Figure 2, locate microcircuit U2. Remove the microcircuit using standard ESD precautions.

5. Install the supplied version 037 microcircuit, using care to match the index notch with the notch in the chip socket, assuring that pin 1 of the microcircuit matches pin 1 of the socket. Press firmly into socket.

6. Install processor board into backplane connector XA1.

7. Using Phillips screwdriver, install screw securing processor board to standoff.

8. Disconnect the DB-9 cable connector from the fiber optic modem inside the electronics enclosure on top of the Faraday box.

9. Connect the PC to the DB-9 cable connector in the electronics enclosure using the Y-shaped RS232 adapter cable. Turn on the PC, initialize PROCOMM Plus and press any key to enter the terminal mode. Use the ALT-P command to set the PC to "2400, N, 8, 1" to establish the correct communications protocol with the sensor. Place CAPS LOCK to ON.

10. At the DCP, turn the visibility sensor circuit breaker to ON (left) position.

11. Verify that the PC displays the sensor initialization message shown below.

    *** VIS VER 37.00 - 6220 ***

    The "6220" refers to the sensor model number.
    The “37.00" refers to the firmware version. For this procedure the firmware version should be 37.00 or greater.

12. At the PC, type "VG.” The sensor will enter the V mode (Extended Diagnostics) and verify the response:

    VPXXXXXXXXPPPP PPPOPP PPP PPPP XXXX XX

    The sensor status bytes reported above should be all "P" for pass with the exception of byte 22, which should be "0" or "1." A "1" indicates the "Heater Diagnostics" for the hood and electronics heaters are being used, a "0" indicates they are not. The values marked with "X" are irrelevant to this procedure and should be ignored. If any "P" is reported as an "F", refer to the ASOS Site Maintenance Manual Heater Troubleshooting Procedures, Chapter 6, Table 6.5.6 before proceeding.

13. At the PC type “VF.” Enter password EIEIO. Press ENTER until serial number requested. Enter the sensor serial number. Press ENTER until the VF command is completed. Verifying that the correct data is present.

NOTE “DISABLING HEATER DIAGNOSTICS”

After following this procedure the sensor will no longer test individual sensor heaters during routine operation. Remember to place a note in the SYSLOG stating that heater diagnostics have been disabled in the Visibility Senor. All Heaters must be checked with an Ohm meter every 90 days. Refer to the Heat Diagram (Figure 3). If Heaters fail, replace the appropiate FRU in accordance with the Site Technical Manual S-100.

14. Press Enter until the following question appears:
    “Heaters installed?” (Y or N) [Y]>N. The response in this situation is No [N].
    The sensor will reply:
    “Need password to disable heater diagnostics”
    “Password?...==>????” Type Chill (Capital C, lowercase hill)
    The sensor will respond with:
    “Heater diagnostics disabled.”

Press enter until the VF command is completed, verifying that the remaining data is correct.

15. At the PC type "**VH**." Press enter until the "VH" command is completed, verifying that the correct data is present. Continue to step 7.

TEARDOWN

16. Disconnect the PC DB-9 cable connector from the fiber optic modem and install the DB-9 cable connector removed in step 3.3.

17. Using the large flat-tipped screwdriver, close the visibility sensor electronics enclosure access door and secure.

18. Raise the visibility sensor and install hinge pin.

19. At the DCP, turn the visibility sensor circuit breaker to the ON (left) position.

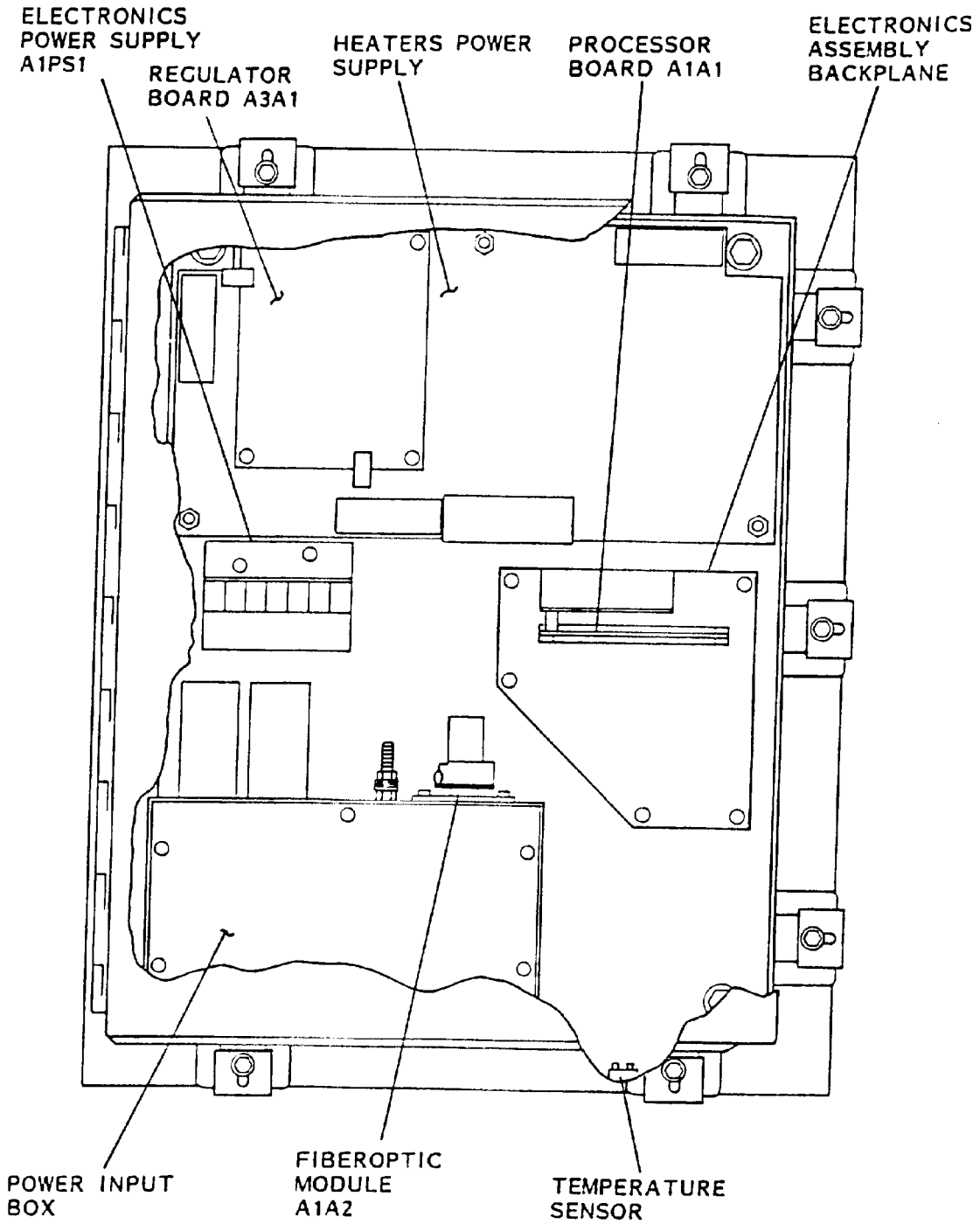
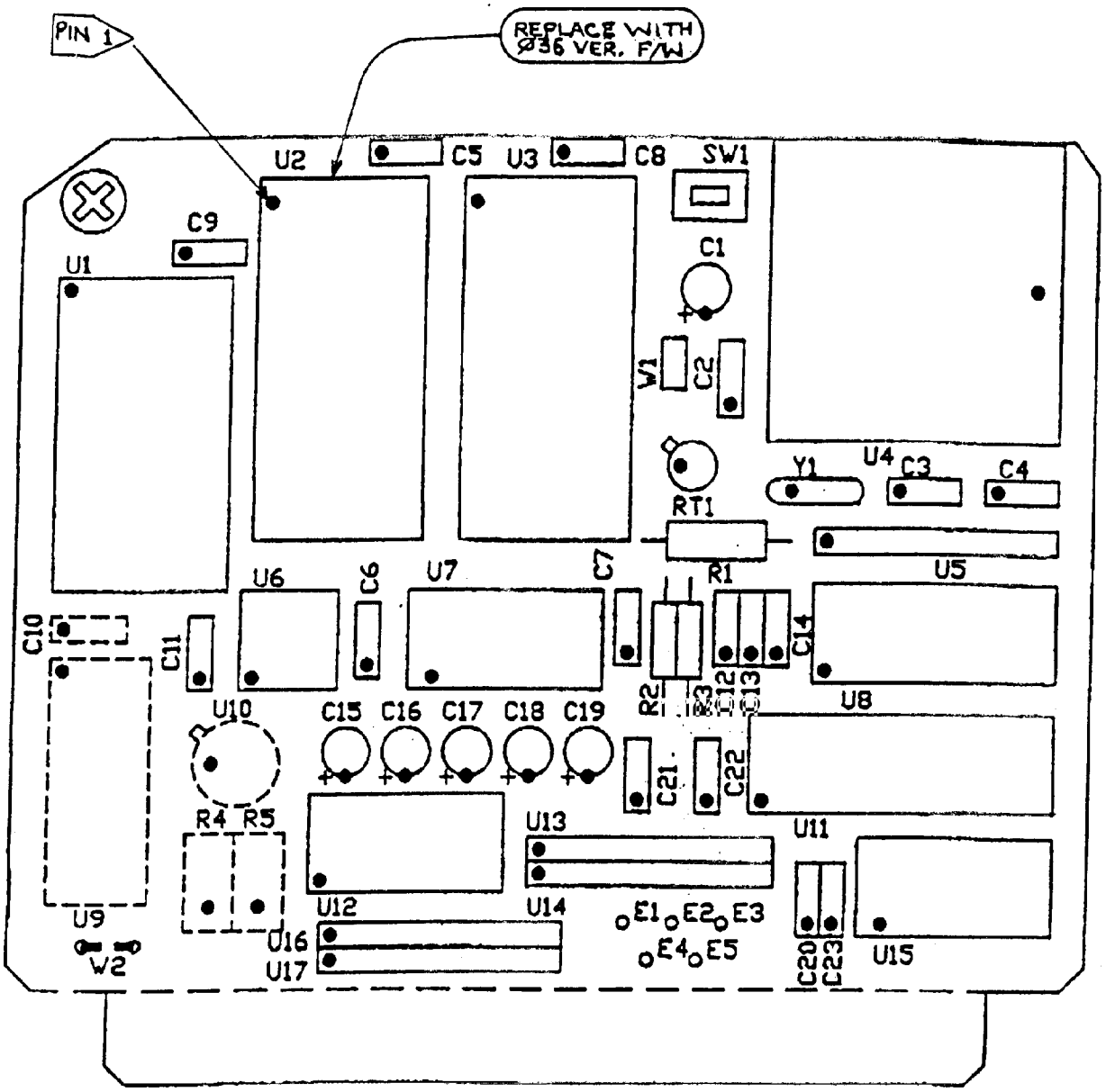
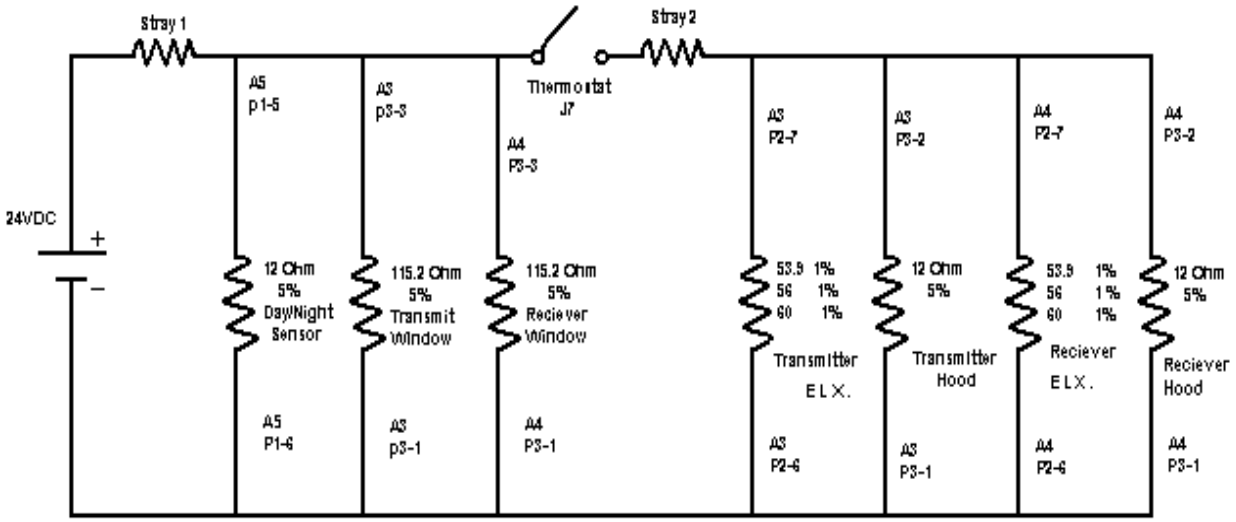


Figure 1 Visibility Sensor Electronics Enclosure



VISIBILITY PROCESSOR BOARD
P/N 32194-1
FIGURE 2



Heater Diagram
Figure 3

INSTRUCTIONS

FIELD MODIFICATION KIT - Visibility Sensor Crossarm P/N 31830

1.0 Prevention of Cables Snagging

1.1 GENERAL

Description of Change:

A stainless steel shield will be inserted into each visibility sensor crossarm housing to restrain the cables from contacting the transmitter and receiver canisters. This will prevent the canisters from snagging the cables during insertion and removal. The intent is to prevent undue stress on the cables and thus improve service life.

1.2 PROCEDURE

Table 2 provides the procedure to remove and install the hood cable guides.

Material Required: 2 each Hood Cable Guides

Table 2. Replacing Visibility Hood Cable Guide

VISIBILITY SENSOR HOOD CABLE GUIDE INSTALLATION PROCEDURE

Tools Required:
15 feet of rope
15/16-inch wrench
No. 1 Phillips screwdriver
Small flat-tipped screwdriver
Seam ripping tool

WARNING

Death or severe injury may result if power is not removed from sensor before performing maintenance activities.

1. Coordinate with site observer, if applicable, and make an entry in the SYSLOG.

2. At the DCP cabinet, set the visibility sensor circuit breaker module to OFF (right) position.

3. Remove the receiver canister from the visibility crossarm in accordance with the Site Technical Manual Chapter 6, Table 6.5.7.

4. Install the hood cable guide as follows:

   a. Shrinkable tubing on the heater wires coming from the window assembly and the signal cables coming through the crossarm must be eliminated from the hood cavity. A seam ripping tool is provided with the retrofit kit for use in stripping the tubing from the wire bundles. With steady pressure, the tool will slit the tubing as it is pressed inward.

      Remove all of the tubing from the heater wire bundle.

      Remove enough tubing from the signal wire bundle so none remains in the hood cavity; about 1 inch beyond the point where it enters the hood from the crossarm. There is sufficient slack in the bundle to allow it to be pulled far enough into the cavity.

   b. With the tubing removed, the wire bundles can be flattened against the side of the hood. Arrange the wires so the larger heater wires, the green ground wire, and the coax cable are at the bottom as shown in the Figure 4.

   c. The cable guides are symmetrical, so they will fit in either hood. Holding the wires against the side of the hood, insert the guide so it is positioned between the upper and innermost of the canister slides. You will feel a positive indication that it is captured. Slowly press inward, keeping a slight pulling pressure on the wires to keep them from being snagged by the leading edge of the guide. Some wiggling might be required. The guide has been completely inserted when it bottoms-out against the window assembly.

   d. The angular shape of the ends of the guides allows the wiring to be reattached to the canister assemblies as usual.

5. Re-install the receiver canister into the crossarm in accordance with the Site Technical Manual Chapter 6, Table 6.5.7.

6. Remove the transmitter canister from the visibility crossarm in accordance with the Site Technical Manual Chapter 6, Table 6.5.7.

7. Repeat steps 4a thru 4d.

8. Re-install the transmitter canister into the crossarm in accordance with the Site Technical Manual Chapter 6, Table 6.5.7.

9. At the DCP cabinet, set the visibility sensor circuit breaker module to **ON** (left) position.

VISIBILITY HEAD INSPECTION

See ASOS Site Manual S-100 for removal and installation procedures for the Visibility Receiver (table 6.5.7) and Transmitter (table 6.5.8).

With the Receiver and Transmitter canisters removed from the sensor head, the procedure to inspect for proper solder connection of the internal heater wiring is the same for both units.

1. Use a #1 Phillips screwdriver to remove the three screws located approximately 2.5 inches from the connector end and at approximately 120 degree intervals around the canister.

   NOTE: BE EXTREMELY CAREFUL as the internal portion of the canister will freely slide out toward the lens end with these screws removed. Do not allow the optics end of the canister to impact on the work surface.

2. Locate the gold colored heater resistor attached to the rod that runs the length of the canister above the circuit board.

3. Gently tug on both ends of the wires that connect the gold resistor to the circuit board to ensure that the connections are securely soldered and not merely pushed into the terminations. If a loose connection is found, replace the canister.

4. Reverse the disassembly procedure to reassemble the canister. The three retaining screws will only line up with the case in one position. Simply rotate the housing around the internal portion until all screw holes are visible.

5. When it has been verified that the heater wiring is properly soldered, place a small dot of red nail polish near the DB9 connector on the end of the canister to indicate that the unit has been checked and verified.

   NOTE: Clean lenses in accordance with the Site Technical Manual Chapter 6, Table 6.5.2 before placing canisters back into sensor head.

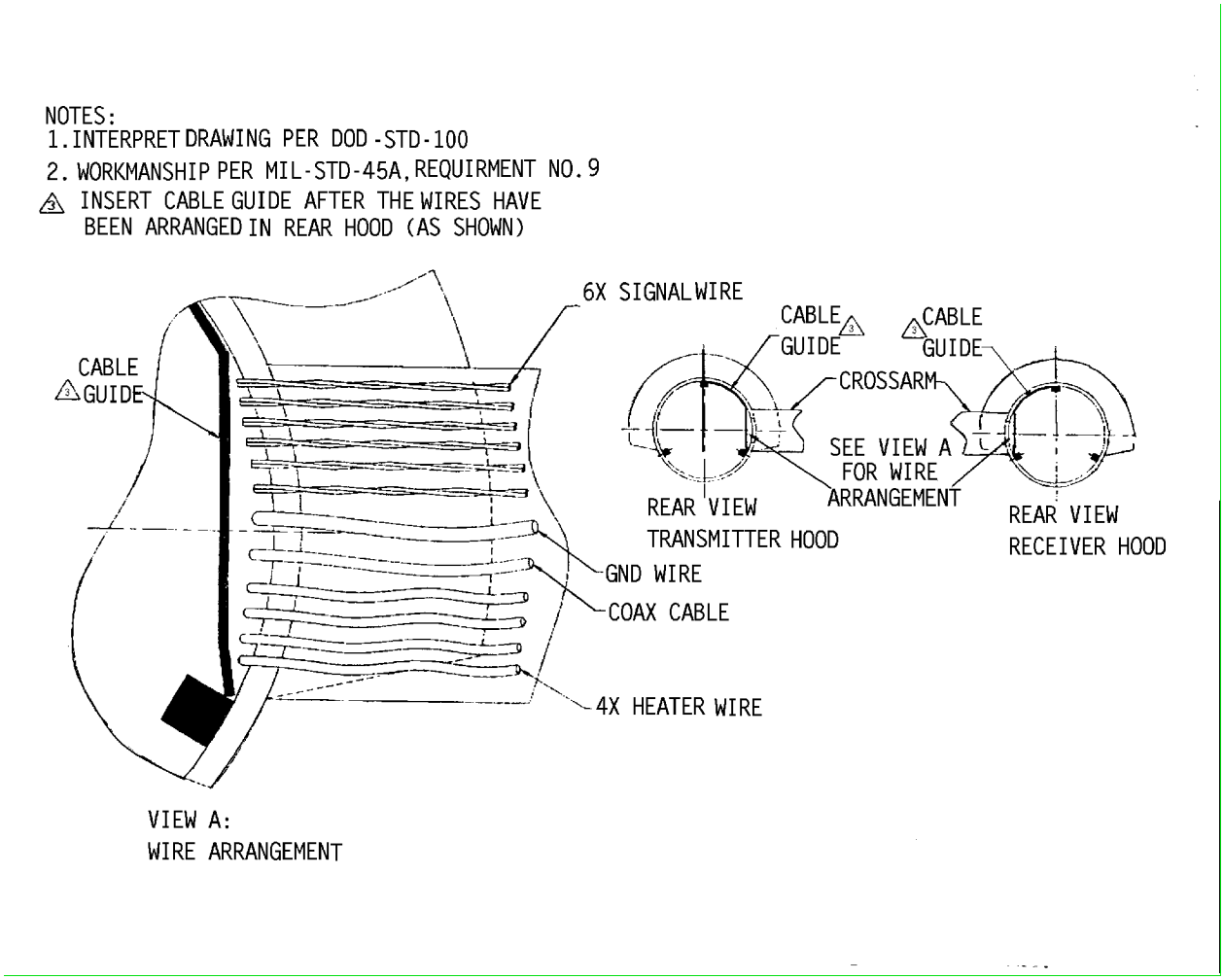

NOTES:
1. INTERPRET DRAWING PER DOD-STD-100
2. WORKMANSHIP PER MIL-STD-45A, REQUIRMENT NO. 9
3 INSERT CABLE GUIDE AFTER THE WIRES HAVE BEEN ARRANGED IN REAR HOOD (AS SHOWN)
6X SIGNAL WIRE
CABLE GUIDE 3
CABLE GUIDE 3
CABLE GUIDE 3
CROSSARM
SEE VIEW A FOR WIRE ARRANGEMENT
REAR VIEW TRANSMITTER HOOD
REAR VIEW RECEIVER HOOD
GND WIRE
COAX CABLE
4X HEATER WIRE
VIEW A:
WIRE ARRANGEMENT

Figure 4

The Visibility Firmware Version 037 was tested at the following sites:

Eastern Region:	ALB	Albany	NY
	BGM	Binghamton	NY
	BUF	Buffalo	NY
	CLE	Cleveland	OH
Southern Region:	ABQ	Albuquerque	NM
	JAN	Jackson	MS
Central Region:	ABR	Aberdeen	SD
	BIS	Bismarck	ND
	CEZ	Cortez	CO
	DVN	Davenport	IA
	FSD	Sioux Falls	SD
	GRB	Green Bay	WI
	IMT	Iron Mountain	MI
	LBF	North Platte	NE
Western Region:	BOI	Boise	ID
	GTF	Great Falls	MT
	HVR	Havre	MT
	SLC	Salt Lake City	UT
Alaska Region	ANC	Anchorage	AK
	OME	Nome	AK

A-26

Eastern Region

7MY	ACY	AQW	BFD	BUY	CAK	CEU	CLE	CQX	CUB	CVG	DKK
DSV	ELZ	ERI	FIT	FOK	GED	HFD	HVN	HWV	IJD	ILG	IPT
LBT	MEB	MGJ	MRH	N00	N22	N63	N80	OFP	OGB	ORE	PLB
PTW	PYM	RZZ	SEG	SLK	TAN	TDZ	THV	W52	YNG		

Southern Region

21A		39J	81J	AGS	AHN	AMA	ATL	ATL	BFM	BKV	BVO
CDS	CSG	CSM	DAB	DHT	DNL	F90	FDR	GIF	GOK	GVL	HBG
HBR	HKA	HSV	JAN	LAW	LEE	M50	M76	MCN	MCO	MCO	MGM
MKO	MLC	MTH	PGD	PNC	PWA	ROW	SAT	SWO	TRI	TUP	TYS
X41											

Central Region

3SM	ADG	AIA	AKO	ALS	ASX	BDE	BEH	BIS	BPI	BRD	BYG
C19	CAG	COS	DEN	DGW	DSM	EEO	ENW	EVW	FFT	FLD	FOE
FSD	GEY	GLD	GLR	GRI	GSH	HEI	HIB	HSI	HYR	ICT	IEN
IMT	ISW	IXD	JKL	LAA	LBF	LHX	LIC	LNK	MCK	MFI	MTJ
NED	OJC	OVS	PKD	PPF	PUB	RAC	RAP	RHI	RIL	SBM	SGF
SNY	SPI	SUX	SUX	TOP	TOR	TQE	WLD				

Western Region

1S4		3S2	AVX	BFL	BHK	BNO	CLM	DLN	ELN	EUG	FCA
FHR	GEG	GTF	HLN	LGB	LVM	LWS	MAE	MHS	MLP	MMV	MSO
O45	OLF	OMK	ONO	OVE	PHX	PUW	RBG	SCK	SDM	SMF	SMX
U11	U73	WVI	YKM								

Alaska Region

A8L		BTT	CDB	FAI	JNU	KAL	MCG	MRI	SNP	TKA	YAK